WHAT IS CLAIMED IS:

1. An exposure apparatus which exposes substrates to a pattern on a master, comprising:

first, second, and third chucks which hold the substrates;

a first fine adjustment stage which holds said first chuck to perform fine driving;

a second fine adjustment stage which holds said second chuck to perform fine driving;

a coarse adjustment stage on which said first and second fine adjustment stages are mounted and which can move in an X-Y plane substantially perpendicular to an optical axis;

an exposure unit which performs exposure operation for the substrate held by said first chuck;

a measurement unit which performs measurement operation for the substrate held by said second chuck; and

a controller which drives said coarse adjustment stage and causes said measurement and exposure units to perform the measurement and exposure operations, respectively,

wherein said controller performs in parallel the measurement and exposure operations for the substrates by serially performing

an operation of unloading the substrate having undergone the exposure operation together with said

first chuck from said first fine adjustment stage,

an operation of moving the substrate having undergone the measurement operation from said second fine adjustment stage to said first fine adjustment stage while the substrate is held by said second chuck, and

an operation of loading a substrate to be subjected to the measurement operation next while the substrate is held by said third chuck.

2. The apparatus according to claim 1, wherein said first chuck also serves as said third chuck.

3. The apparatus according to claim 1, further comprising a chuck in addition to said first to third chucks.

4. The apparatus according to claim 1, wherein the master and substrates are brought into a stationary state during the exposure operation.

5. The apparatus according to claim 1, wherein the master and substrates are scanned during the exposure operation.

6. The apparatus according to claim 1, further comprising a chuck holding mechanism which temporarily holds said first and second chucks outside said coarse adjustment stage, wherein unloading of said first chuck from said first fine adjustment stage and movement of said second chuck from said second fine adjustment stage to said first fine adjustment stage are performed

in parallel by temporarily moving said first chuck which holds the substrate having undergone the exposure operation and second chuck which holds the substrate having undergone the measurement operation from said coarse adjustment stage to said chuck holding mechanism, moving said coarse adjustment stage separated from said first and second chucks, and returning said second chuck to said coarse adjustment stage.

7. The apparatus according to claim 1, further comprising a chuck holding mechanism which temporarily holds said first, second, and third chucks outside said coarse adjustment stage, wherein unloading of said first chuck from said first fine adjustment stage, movement of said second chuck from said second fine adjustment stage to said first fine adjustment stage, and loading of said third chuck to said second fine adjustment stage are performed in parallel by temporarily moving said first chuck which holds the substrate having undergone the exposure operation and second chuck which holds the substrate having undergone the measurement operation from said coarse adjustment stage to said chuck holding mechanism, moving said coarse adjustment stage separated from said first and second chucks, and returning said second and third chucks to said coarse adjustment stage.

8. The apparatus according to claim 1, wherein at

least one reference plane for a height direction is arranged on an edge of each of said chucks which hold the substrates, a first sensor which measures the reference plane in the height direction is arranged below a projection system of said exposure unit, a second sensor which measures the reference plane in the height direction and a third sensor which measures the substrate in the height direction are arranged below said measurement unit, said measurement unit measures a height of the reference plate by the second sensor and measures a height at each position in the X-Y plane of the substrate by the third sensor, and said exposure unit measures the reference plane in the height direction by the first sensor, then calculates each position in the X-Y plane of the substrate from measurement results of the height of the reference plane and the height at each position in the X-Y plane of the substrate obtained in advance by the second and third sensors in said measurement unit and a measurement result by the first sensor, and performs the exposure operation by driving in the height direction or the height direction and a tilt direction of the substrate such that each exposure region on the substrate coincides with a position of an image plane of the projection system.

9. The apparatus according to claim 8, wherein measurement of the height at each position in the X-Y

plane of the substrate by the third sensor in said measurement unit, and exposure operation for the substrate having undergone measurement in said exposure unit are performed in parallel.

10. The apparatus according to claim 8, wherein measurement of a reference plane on said first chuck by the first sensor and measurement of a reference plane on said second chuck by the second sensor are performed in parallel.

11. The apparatus according to claim 8, wherein calibration of the second and third sensors is executed by simultaneously performing measurement of a reference plane on said second chuck by the second sensor and measurement of the reference plane on said second chuck by the third sensor.

12. The apparatus according to claim 8, wherein the second sensor measures the reference plane and the substrate in the height direction, and the third sensor can be removed.

13. The apparatus according to claim 8, wherein said first and second sensors are of the same type.

14. The apparatus according to claim 8, wherein the first and second sensors are of an electrostatic capacitance type.

15. The apparatus according to claim 8, wherein the third sensor comprises a projection unit which projects a specific mark onto a substrate by oblique incidence

and a detection unit which image-senses the specific mark.

16. The apparatus according to claim 1, wherein at least one reference mark for X and Y directions is arranged on an edge of each of said chucks which hold the substrates, a first alignment unit which measures the reference mark in the X and Y directions is arranged in said exposure unit, a second alignment unit which measures the reference mark and alignment marks for measurement shots on each substrate in the X and Y directions is arranged in said measurement unit, said measurement unit measures the reference mark in the X and Y directions and a position of the alignment marks for the measurement shots in the X and Y directions by the second alignment unit, and said exposure unit measures the reference mark in the X and Y directions by the first alignment unit, calculates an alignment error at each position of the substrate from measurement results of the reference mark and each position in the X and Y directions of the substrate obtained in advance by the second alignment unit in said measurement unit and a measurement result of the reference mark by the first alignment unit, and performs the exposure operation by correcting the error such that the substrate is exposed to the pattern on the master at a predetermined position.

17. The apparatus according to claim 16, wherein the

measurement of the position of the alignment marks for the measurement shots on the substrate by the second alignment unit is performed in parallel with the exposure operation or by temporarily interrupting the exposure operation when the second alignment unit comes to near the measurement shot during the exposure operation for the substrate by said exposure unit.

18. The apparatus according to claim 17, wherein said coarse adjustment stage is driven such that a Y-direction speed in turning operation becomes zero at a Y-coordinate of the position of the alignment mark for the measurement shot and is temporarily stopped such that a X-direction speed becomes zero at an X-coordinate of the position of the alignment mark for the measurement shot.

19. The apparatus according to claim 16, wherein the measurement of the reference mark in the X and Y directions on said first chuck by the first alignment unit and the measurement of the reference mark on said second chuck by the second alignment unit are performed in parallel.

20. The apparatus according to claim 16, wherein the first alignment unit can perform simultaneous measurement at high and low magnifications, performs the simultaneous measurement at the high and low magnifications for the reference mark on said first chuck, performs position measurement for the reference

mark if the reference mark falls within a high-magnification measurement range, and performs position measurement for the reference mark by driving said first adjustment stage or said first adjustment stage and coarse adjustment stage on the basis of a measurement result of the low magnification to move the reference mark to the high-magnification measurement range if the reference mark falls outside the high-magnification measurement range.

21. The apparatus according to claim 16, wherein the second alignment unit can perform simultaneous measurement at high and low magnifications, performs the simultaneous measurement at the high and low magnifications for the reference mark on said second chuck, performs position measurement for the reference mark if the reference mark falls within a high-magnification measurement range, and performs position measurement for the reference mark by driving said second adjustment stage or said second adjustment stage and coarse adjustment stage on the basis of a measurement result of the low magnification to move the reference mark to the high-magnification measurement range if the reference mark falls outside the high-magnification measurement range.

22. The apparatus according to claim 1, wherein a position of a chuck reference mark on each of said chucks and a position of an alignment mark on the

substrate held on said chuck are measured before loading said chuck to said coarse adjustment stage, and said chuck is loaded to said coarse adjustment stage such that the chuck reference mark and said coarse adjustment stage have a predetermined positional relationship.

23. The apparatus according to claim 1, wherein a position of a chuck reference mark on each of said chucks and a position of an alignment mark on the substrate held on said chuck are measured before loading said chuck to said coarse adjustment stage, and

relative alignment of said chuck with the substrate is performed such that the alignment mark and the chuck reference mark have a predetermined relative positional relationship.

24. The apparatus according to claim 1, wherein a height of a chuck reference mark on each of said chucks and heights at a plurality of positions in X and Y directions of the substrate held on said chuck are measured before loading said chuck to said coarse adjustment stage, and

after said chuck is loaded to said second fine adjustment stage, said chuck is driven in height and tilt directions by said second fine adjustment stage on the basis of a measurement result such that the height of the chuck reference mark and the heights of the substrate fall within measurement ranges of second and

third sensors.

25. The apparatus according to claim 1, wherein a driving stroke of said second fine adjustment stage is set to be longer than a driving stroke of said first fine adjustment stage.

26. The apparatus according to claim 1, wherein said first and second fine adjustment stages have different mechanical resonance frequencies.

27. The apparatus according to claim 1, wherein control parameters for said first and second fine adjustment stages in exposure operation by said exposure unit are made to differ from control parameters for said first and second fine adjustment stages in measurement operation, to be performed during the exposure operation, for a position of an alignment mark for a measurement shot on each of the substrates by said measurement unit.

28. The apparatus according to claim 1, wherein a bar mirror is provided in each of said first and second fine adjustment stages to enable position measurement in X and Y directions by a laser interferometer of said coarse adjustment stage, and a relative error in the X direction and a relative error in the Y direction of each bar mirror of said first and second fine adjustment stages can be measured by driving said coarse adjustment stage in the X and Y directions while at least one of said first and second fine adjustment

stages is fixed with respect to said coarse adjustment stage.

29. The apparatus according to claim 1, wherein a plurality of projections are formed in each of upper surfaces of top plates of said first and second fine adjustment stages.

30. The apparatus according to claim 1, wherein said coarse adjustment stage is driven at a high speed when said first and second fine adjustment stages each have a chuck or when said first and second fine adjustment stages have no chucks.

31. The apparatus according to claim 1, wherein a chuck is held on each of said first and second fine adjustment stages, and at least one chuck is provided outside said coarse adjustment stage in the exposure and measurement operations, and each of the chucks outside said coarse adjustment stage performs all or some of unloading of a substrate from the chuck, loading of a substrate to be processed next, measurement of a height of a chuck reference plane, measurement of a position of a chuck reference mark, measurement of a height of the substrate, measurement of a position of an alignment mark on the substrate, and relative alignment of the alignment mark on the substrate with the chuck reference mark, in parallel with the exposure and measurement operations on said coarse adjustment stage.

32. The apparatus according to claim 1, wherein said chucks circulate and move through a clean air space, a nitrogen-purged space, or a vacuum space, a substrate having undergone exposure is detached from the corresponding chuck at an unloading position of the space and is unloaded from the space to an outer air side, and a substrate to be exposed is loaded at a loading position of the space from the outer air side to the corresponding chuck.

33. The apparatus according to claim 1, wherein both unloading of a substrate from a chuck in the clean air space, nitrogen-purged space, and vacuum space and unloading of a chuck from the space are performed by the same unloading unit.

34. The apparatus according to claim 1, wherein a position of a chuck reference mark is measured again after the exposure operation in said exposure unit or the measurement operation in said measurement unit, and cleaning of top plates of said fine adjustment stages, issuance of a warning, or abnormal stop is performed when a measurement result exceeds a predetermined amount.

35. An exposure apparatus which exposes substrates to a pattern on a master through a projection system, comprising:

first, second, and third chucks which hold the substrates;

a fine adjustment stage which holds said first chuck to perform fine driving;

a chuck holding unit which holds said second chuck;

a coarse adjustment stage on which said fine adjustment stage and chuck holding unit are mounted and which can move in an X-Y plane substantially perpendicular to an optical axis of the projection system;

an exposure unit which performs exposure operation for the substrate held by said first chuck;

a measurement unit which performs measurement operation for the substrate held by said second chuck; and

a controller which drives said coarse adjustment stage and causes said measurement and exposure units to perform the measurement and exposure operations, respectively,

wherein said controller performs in parallel the measurement and exposure operations for the substrates by serially performing

an operation of unloading the substrate having undergone the exposure operation together with said first chuck from said fine adjustment stage,

an operation of moving the substrate having undergone the measurement operation from said chuck holding unit to said fine adjustment stage while the

substrate is held by said second chuck, and

an operation of loading the substrate to be subjected to the measurement operation next to said chuck holding unit while the substrate is held by said third chuck.

36. The apparatus according to claim 35, wherein said first chuck also serves as said third chuck.

37. The apparatus according to claim 35, further comprising a chuck in addition to said first to third chucks.

38. An exposure method in an exposure apparatus which comprises first, second, and third chucks which hold substrates, a first fine adjustment stage which holds the first chuck to perform fine driving, a second fine adjustment stage which holds the second chuck to perform fine driving, a coarse adjustment stage on which the first and second fine adjustment stages are mounted and which can move in an X-Y plane substantially perpendicular to an optical axis, an exposure unit which performs exposure operation for the substrate held by the first chuck, a measurement unit which performs measurement operation for the substrate held by the second chuck, and a controller which drives the coarse adjustment stage and causes the measurement and exposure units to perform in parallel the measurement and exposure operations, respectively, and exposes the substrates to a pattern on a master,

comprising:

a step of unloading the substrate having undergone the exposure operation together with the first chuck from the first fine adjustment stage;

a step of moving the substrate having undergone the measurement operation from the second fine adjustment stage to the first fine adjustment stage while the substrate is held by the second chuck, and

a step of loading a substrate to be subjected to the measurement operation next while the substrate is held by the third chuck.

39. An exposure apparatus which exposes substrates to a pattern on a master, comprising:

a plurality of fine adjustment stages which hold chucks holding the substrates to perform fine driving;

a coarse adjustment stage on which said plurality of fine adjustment stages are mounted and which can move in an X-Y plane substantially perpendicular to an optical axis;

exposure means for performing exposure operation for each of the substrates held by the chucks;

measurement means for performing measurement operation for each of the substrates held by the chucks; and

control means for driving said coarse adjustment stage and causing said measurement and exposure means to perform in parallel the measurement and exposure

operations, respectively.